



Green is Gold for the Molecular Foundry

Sustainable Design recognized by Green Building Council

The US Green Building Council has recognized the energy-efficient and sustainable design of LBNL's newest building, the Molecular Foundry, by awarding it a "gold" rating based on the Leadership in Energy and Environmental Design (LEED) standards. The Molecular Foundry is the first building at Berkeley Lab designed to meet the strict LEED criteria.

The LEED Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. The standards promote a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

The Molecular Foundry was designed from the very beginning with energy efficiency and sustainable design in mind. The entire team – lab management, operations, maintenance personnel, EH&S, consultants, and architects met in a series of design "charrettes" to establish sustainability goals and to perform a life cycle cost analysis to determine most suitable energy use reduction approaches. A "right-sizing" approach was used to determine utility load requirements; as a result, Foundry's energy performance exceeds the state and federal standards by 25 to 35 percent.

One aspect of the energy efficiency of the building is the design of its 42 chemical fume hoods. By using expertise in LBNL's Energy and Environmental Technologies Division (EETD), the air flow (and hence the energy use) of the hoods was reduced by 20% while still providing equivalent protection for the hood user. LBNL-based innovations were also used to reduce energy consumption in the buildings "class 100" clean room. The planning group borrowed concepts used in EETD's high-tech buildings program and custom-designed the 150 fan filter units with the highest efficiencies, and with modularity that allowed flexible replacement, repair and use. In addition, double-paned exterior windows were coated with a film that blocks ultraviolet rays, allowing daylighting and views – a unique feature for a clean room.

To achieve water conservation and efficiency, a continuous cooling water loop avoided the use of the traditional once-through approach, and a vacuum system reduced the need for energy-consuming aspirators. Outside, landscaping is dominated by succulents and native grasses requiring minimal watering. Green concepts were used during construction. About 85 percent of the waste generated was recyclable. Care was taken to install rapidly renewable materials, such as the use of bamboo flooring. All the lights have occupancy sensors and high-efficiency ballasts. Carpets and paint were carefully chosen so that they would not "out-gas" (i.e., emit vapors or volatile organic compounds). Refrigerants in the chillers have zero ozone-depletion potential. Overall, the facility produces 85% fewer greenhouse-gas emissions than a conventional facility. Finally, as a result of the right-sizing of the mechanical systems, all of this was achieved at no net cost compared to typical practice.

The Molecular Foundry at Lawrence Berkeley National Laboratory is a User Facility charged with providing support to research in Nanoscience underway in academic, government and industrial laboratories around the world. The Foundry provides users with instruments, techniques and collaborators to enhance their studies of the synthesis, characterization and theory of nanoscale materials.

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